IN THE CLAIMS

Please cancel claims 2, 3, 5, 6, 18-20, 22, and 24-26.

Please add the following new claims in the listing below. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1-26. (Cancelled)

D1 29 ~~27~~. (New) A method comprising:

heating a thermal dissipation device to an elevated temperature;

exposing the thermal dissipation device to a first medium to lower the temperature of the thermal dissipation device to an intermediate temperature;

exposing the thermal dissipation device to a second medium to lower the temperature of the thermal dissipation device to a cryogenic temperature, the cryogenic temperature being below the intermediate temperature;

bringing the temperature of the thermal dissipation device up to an ambient temperature; and

thermally connecting the thermal dissipation device to a microelectronic device to dissipate heat generated within the microelectronic device.

30 ~~28~~. (New) The method of claim 29 ~~27~~, wherein said heating changes a microstructure of a material of the thermal dissipation device from a fine grain structure to a coarse grain structure, the fine grain structure corresponding to a first thermal conductivity, the coarse grain structure corresponding to a second thermal

conductivity, the second thermal conductivity being greater than the first thermal conductivity, the microstructure of the material maintaining the coarse grain structure after the temperature of the thermal dissipation device is brought up to the ambient temperature.

31 ~~29~~. (New) The method of claim 30 ~~28~~, wherein the material is a metal.

32 ~~30~~. (New) The method of claim 31 ~~29~~, wherein the metal is at least one of aluminum and copper.

33 ~~31~~. (New) The method of claim 32 ~~30~~, wherein the thermal dissipation device is a heat sink.

34 ~~32~~. (New) The method of claim 33 ~~31~~ wherein the microelectronic device is a microelectronic die mounted to a package substrate.

35 ~~33~~. (New) The method of claim 34 ~~32~~, wherein the intermediate temperature is approximately -100 degrees Fahrenheit.

36 ~~34~~. (New) The method of claim 35 ~~33~~, wherein the cryogenic temperature is approximately -327 degrees Fahrenheit.

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37 ~~35~~. (New) The method of claim 36 ~~34~~, wherein the first medium is air directly over a container containing a bath of a cryogenic material.

38 ~~36~~. (New) The method of claim 37 ~~35~~, wherein the second medium is the bath of cryogenic material.

39 ~~37~~. (New) The method of claim 38 ~~36~~, wherein the cryogenic material is liquid nitrogen.

40 ~~38~~. (New) A method comprising:

changing a microstructure of a material of a thermal dissipation device from having a first number of grain boundaries to having a second number of grain boundaries by heating the material to an elevated temperature, the first number of grain boundaries corresponding to a first thermal conductivity, the second number of grain boundaries corresponding to a second thermal conductivity, the second thermal conductivity being higher than the first thermal conductivity;

lowering the temperature of the material to an intermediate temperature at a first rate;

lowering the temperature of the material to a cryogenic temperature at a second rate, the cryogenic temperature being below the intermediate temperature;

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bringing the temperature of the material up to an ambient temperature, the microstructure of the material maintaining the second number of grain boundaries; and

thermally connecting the thermal dissipation device to microelectronic device to dissipate heat generated within the microelectronic device;

41 ~~39~~. (New) The method of claim 40 ~~38~~, wherein the second rate is higher than the first rate.

42 ~~40~~. (New) The method of claim 40 ~~38~~, wherein the thermal dissipation device is a heat sink, the material is metal, and the microelectronic device is a microelectronic die mounted to a package substrate.

43 ~~41~~. (New) A microelectronic package comprising:

a package substrate;

a microelectronic die mounted to the package substrate; and

a thermal dissipation device thermally connected to the microelectronic die to dissipate heat generated within the microelectronic die, the thermal dissipation device made by a process comprising:

heating the thermal dissipation device to change a microstructure of a material thereof by reducing the number of grain boundaries from a first number of grain boundaries to a second number of grain boundaries, the first

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number of grain boundaries corresponding to a first thermal conductivity, the second number of grain boundaries corresponding to a second thermal conductivity, the second thermal conductivity being greater than the first;

exposing the thermal dissipation device to a first medium to bring the temperature of the thermal dissipation device to an intermediate temperature;

exposing the thermal dissipation device to a second medium to bring the temperature of the thermal dissipation device to a cryogenic temperature, the cryogenic temperature being below the intermediate temperature; and

bringing the temperature of the thermal dissipation device up to an ambient temperature, the microstructure of the material of the thermal dissipation device maintaining the second number of grain boundaries.

44 ~~42~~. (New) The microelectronic package of claim 43 ~~41~~, wherein the material is a metal alloy having precipitating constituents.

45 ~~43~~. (New) The microelectronic package of claim 44 ~~42~~, wherein the material is aluminum alloy T6061.